# Information Technology Foundations

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| **Primary Career Cluster:** | Information Technology |
| **Consultant:** | Bethany King Wilkes, (615) 532-2844, Bethany.Wilkes@tn.gov |
| **Course Code(s):** | 6095 |
| **Recommended Prerequisite(s):** | Keyboarding (4-8) |
| **Credit:** | 1-2* |
| **Grade Level:** | 9-10 |
| **Aligned Student Organization(s):** | Skills USA: www.tnskillsusa.com<br>Brandon Hudson, (615) 532-2804, Brandon.Hudson@tn.gov |
| **Teacher Resources:** | http://www.tn.gov/education/cte/InformationTechnology.shtml |

## Course Description

*Information Technology Foundations* is designed to prepare students with work-related skills for advancement in the telecommunication and information technology career paths. Content provides students the opportunity to acquire basic foundational knowledge and skills in both theory and practical applications in direct current, alternating current, and power supply circuits. Course content includes fundamentals of networking concepts for personal computers (PC), determining system requirements, setting up equipment, and performing installation tests for the end user. Content provides the opportunity to evaluate and install peripheral devices and become familiar with operating systems. Course content provides students the opportunity to acquire basic fundamental skills in both theory and practical applications of language, structure, and typography. Standards 11 through 13 stress layout and design guidelines as applied in the design of markup language documents. Course content will be delivered through virtual training and hands-on methods. Competencies mastered during this course help prepare students toward acquiring A+ and/or Net+ certification and/or Web design employment.

***It is strongly recommended that administration and guidance follow the scope and sequence and course recommendations as listed.***

*The following implementation options are encouraged:
**-1 credit for Core and two focus areas (listed below)**
**-2 credits for all 16 Standards**

*Core Standards are required for both one *and* two credit implementation options.
**Core Standards:**          1.0, 2.0, 3.0, 4.0

| FOCUS AREAS | STANDARDS |
| --- | --- |
| Electronics Focus: | 5.0, 10.0, 13.0 |
| PCA/A+ Focus: | 6.0, 7.0, 12.0 |
| Networking Focus: | 8.0, 9.0, 11.0 |
| Web Design Focus: | 14.0, 15.0 |

## Course Standards

### Standard 1.0

**Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.**

**The student will:**

1.1 Cultivate positive leadership.
1.2 Participate in SkillsUSA as an integral part of classroom instruction.
1.3 Assess situations and apply problem-solving and decision-making skills within the school, community, and workplace.
1.4 Participate as a team member.

**Sample Performance Tasks**

➢ Create a leadership inventory and use it to conduct a personal assessment.
➢ Participate in various SkillsUSA programs and competitive events such as community service.
➢ Use a formal planning or decision-making process to select, to implement, and to evaluate an activity within the school, community, and workplace.
➢ Develop an annual program of work.
➢ Prepare a meeting agenda for a SkillsUSA monthly meeting.

### Standard 2.0

**Students will evaluate career opportunities and career paths within the information technology industry.**

**The student will:**

2.1 Develop a profile of career opportunities.
2.2 Develop a personal education/career roadmap.
2.3 Project future career opportunities within the information technology industry.

**Sample Performance Tasks**

➢ Develop a list of career opportunities, including education requirements, responsibilities, and salary ranges.

**Standard 3.0**

**Students will analyze the growth and development of the information technology industry to gain insight regarding past, current, and future trends of computer architecture, network architecture, and Web design.**

**The student will:**

3.1     Trace the evolution of computers, networking, the Internet, and the Web.
3.2     Identify people in history who helped to shape the information technology industry.
3.3     Analyze current cultural and economic indicators to anticipate future trends in the information technology industry.
3.4     Explore economic aspects, the free enterprise system, and the role of government as they relate to the information technology industry.

**Sample Performance Task**

➢     Research industry history, trends, and pioneers in computer, Internet, and Web development from the Internet, media research, interviews, and other research sources.

**Standard 4.0**

**Students will interpret and demonstrate the principles of industrial safety standards associated with the information technology industry.**

**The student will:**

4.1     Implement the industrial safety standards established by the Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA).
4.2     Identify and categorize safety hazards and prevention in the information technology industry.
4.3     Exhibit acceptable dress and personal grooming determined by the information technology industry.

**Sample Performance Task**

➢     Conduct a self-inspection of the laboratory and identify modifications necessary for compliance with rules, regulations, and standards of governing agencies.

**Standard 5.0**

**Students will demonstrate an understanding of basic electronic theory, and measure input and output voltages.**

**The student will:**

5.1     Define the relationship given by Ohm's Law.
5.2     Define the relationship given by the formula for electric power.

5.3     Define the relationship between voltages and windings of a transformer.

5.4     Describe the significant differences between alternating current (AC) and direct current (DC).

5.5     Define the relationship between the individual resistances in a circuit and total resistance.

5.6     Students will use basic electrical measuring and construction equipment.

5.6a     Measure AC and DC voltages using a digital multimeter (DMM).

5.6b     Measure AC and DC current using a digital multimeter (DMM).

5.6c     Measure the resistance of a circuit consisting of resistors using a digital multimeter (DMM).

5.6d     Construct simple circuits on a breadboard or with a soldering iron.

**Sample Performance Tasks**

- ➢ Calculate the resistance of a DC circuit, with a given or measured DC voltage and current.
- ➢ Solder together an LED and resistor that can be tested with a 9-VDC battery.

## Standard 6.0

**Students will evaluate the general responsibilities of an operating system.**

**The student will:**

6.1     Compare basic types of operating systems.

6.2     Configure the system through the CMOS setup procedure.

6.3     Analyze the function and purpose of Microsoft Windows operating system.

6.4     Install and configure Microsoft Windows to the basic operational level.

6.5     Diagnose and correct Microsoft Windows basic problems.

6.6     Maintain Microsoft Windows by updating service packs and patches.

**Sample Performance Task**

- ➢ Configure Microsoft Windows to automatically update when updates are available.

## Standard 7.0

**Students will identify and troubleshoot common peripheral devices that can be attached to the unit.**

**The student will:**

7.1     Manipulate keyboard, mouse, CD burners, scanners, and other peripheral devices.

7.2     Evaluate connections or exchange display devices.

7.3     Identify common components and devises that can be attached to the unit.

7.4     Connect a variety of devices to the central processing unit.

7.5     Perform troubleshooting techniques on malfunctioning devices.

**Sample Performance Tasks**

> ➢ Install software for peripheral devices.
> ➢ Diagnose, repair and/or replace malfunctioning devices.

## Standard 8.0

**Students will demonstrate an understanding of basic network structure, and will recognize and describe the characteristics of networking media and connectors.**

**The student will:**

8.1 Evaluate the characteristics of star, bus, mesh, and ring topologies, their advantages and disadvantages.
8.2 Research the characteristics of segments and backbones.
8.3 Compare the advantages and disadvantages of coax, Cat 3, Cat 5, fiber optic, UTP, and STP, wireless and the conditions under which they are appropriate.
8.4 Evaluate the proper procedure for twisted pair cable construction.
8.5 Evaluate the wireless standards and procedures for configuring a wireless device to a network.

**Sample Performance Tasks**

> ➢ Diagram a star, bus, mesh, and ring topologies.
> ➢ Build and test a Cat 5e patch cable.
> ➢ Connect a wireless device to a network.

## Standard 9.0

**Students will compare the basic attributes, purpose, and function of network elements and associate protocols with their appropriate functions.**

**The student will:**

9.1 Research the differences, advantages, and disadvantages of standard protocols.
9.2 Set up and properly configure standard protocols.
9.3 Compare and contrast full and half-duplexing.
9.4 Differentiate a wide area network (WAN) and local area network (LAN).
9.5 Compare and contrast a server, workstation, host, and client.
9.6 Analyze server-based networking and peer-to-peer networking.
9.7 Research the terms cable, network interface card (NIC), and router.
9.8 Compare and contrast broadband and baseband.

**Sample Performance Task**

> ➢ Network two computers using appropriate protocol and test.

**Standard 10.0**

**Students will apply basic digital theory used in computer systems.**

**The student will:**

      10.1    Define the basics of a binary counting system.
      10.2    Define the basics of a hexadecimal counting system.
      10.3    Define the function of digital AND, OR, and NOT functions.

**Sample Performance Task**

> ➤    Construct a truth table for the seatbelt warning light in an automobile.

**Standard 11.0**

**Students will analyze the open system interconnect (OSI) reference model.**

**The student will:**

      11.1    Evaluate the three categories of the open system interconnect (OSI) model.
      11.2    Evaluate the protocols, services, and functions that pertain to each layer of the open system interconnect (OSI) reference model.

**Sample Performance Tasks**

> ➤    List the key internetworking functions of the open system interconnect (OSI) Network layer.

**Standard 12.0**

**Students will analyze major network operating systems, such as Microsoft Windows Server, Novell, Linux, and Unix.**

**The student will:**

      12.1    Research client base that best serve specific network operating systems and their resources.
      12.2    Analyze the directory services of the major network operating systems.

**Sample Performance Tasks**

> ➤    Install and test client software for a given operating system.
> ➤    Create new users and set up their rights.

**Standard 13.0**

**Students will be able to make, verify, and troubleshoot electrical connections of computer hardware.**

**The student will:**

13.1 Make and verify connections of a computer power supply.
13.2 Make and verify connections of multimedia components in a computer system.
13.3 Make and verify connections of data cables in a computer system (e.g. drives, network, USB, serial, printer).
13.4 Make and verify connections of video cables in a computer system.
13.5 Identify and remedy a failed computer power supply.
13.6 Identify and remedy troublesome multimedia components in a computer system.
13.7 Make and verify connections of data cables in a computer system (e.g. drives, network, USB, printer, serial).
13.8 Make and verify connections of video cables in a computer system.
13.9 Contrast and compare the connections and applications of AC versus DC power in computer systems.
13.10 Measure voltages and currents related to computer systems.

**Sample Performance Tasks**

➢ Reconnect cables following a motherboard change.
➢ Reconnect all peripheral components to a computer system.
➢ Set up a computer system for desktop videoconferencing.
➢ Replace a computer system's power supply.
➢ Measure and verify the output voltages in a computer power supply.
➢ Set up a computer system for desktop videoconferencing.
➢ Replace a computer system with a new/different video monitor.

**STANDARD 14.0**

**Students will demonstrate advanced knowledge of the Internet.**

**The student will:**

14.1 Illustrate the relationship of Web design terms to Web designs and software applications.
14.2 Demonstrate the use of search engines and search terms.
14.3 Navigate between Uniform Resource Locator (URL) links.
14.4 Comprehend and apply standard path/file name structure.
14.5 Demonstrate knowledge of Web 2.0 technologies.
14.6 Explain the concept of cloud computing.

**Sample Performance Task**

➢ Research different cloud computing services and discuss how these services may save businesses money to implement.

**Standard 15.0**

**Students will develop proficiency with the features and utilities available with commercial off-the-shelf (COTS) Web building software.**

**The student will:**

15.1    Evaluate the features of commercial off-the-shelf (COTS) Web publishing packages.
15.2    Uses COTS Web publishing software to construct page features.

**Sample Performance Task**

➢    Construct several Web pages with each COTS product. Using a rubic, list the abilities and limitations of each assessed product. Using markup language scripting abilities from previous lessons, modify the constructed pages in those areas that the COTS would not perform.